Technical Requirements Document

T-38 Wheel/Brake Program

Draft Rev J

27 August 2003

Prepared by

Ogden Air Logistics Center

Hill Air Force Base, Utah 84056

Table of Contents

1.0 Purpose/Scope

1.1 **Purpose.** This document lists the hardware and data requirements for the U. S. Air Force (USAF) T-38 Wheel/Brake Program.

1.2 **Scope.** This document is intended for the wheel/brake contractor. Torque performance consistency of this brake is considered critical due to aircraft operation without antiskid.

2.0 Program Management

2.1 **Integrated Master Plan (IMP).** Develop and provide a contract IMP with the proposal. The IMP is a list of events, significant accomplishments, and associated completion criteria for each event. The IMP shall be used throughout contract performance as a management tool to assess progress and determine success in achieving program requirements.

2.2 **Integrated Master Schedule (IMS).** Develop, implement, manage, and update an IMS and Schedule Risk Assessment. Provide the initial IMS and Schedule Risk Assessment no later than one (1) month after receipt of order (ARO) or after contract award. The Schedule Risk Assessment shall include a description of the approach that will be taken to limit the schedule risks as identified in the contractor's IMS. Risk is defined as the probability of a schedule change due to program/technical performance or cost issues.

Technical performance measurement tasks and their correlation with all contractual cost/schedule elements shall also be evaluated. Technical performance measurement tasks, as well as cost reviews, shall be included to reveal potential impacts to the schedule and the contractor's overall successful contract execution and compliance. The assessment shall clearly state the contractor's plan to manage these risks throughout the contract compliance period.

The IMS shall be computer-based and compatible with commercially available scheduling software. It shall be traceable to the IMP and shall contain all critical events, accomplishments, criteria, predecessors and successors, and their dependencies. This schedule shall include critical path analyses.

2.3 **Contractor Performance Review Board.** Attend Contractor Performance Review Board meetings. These meetings will be held at OO-ALC and will be hosted by the OO-ALC Program Manager. The meetings shall serve as a review of the IMP/IMS and contractor compliance to contract requirements (performance, schedules, etc.). The first meeting will be held no later than one (1) month ARO. Follow-on meetings may be held as determined by the OO-ALC Program Manager.

2.4 **Preliminary Design Review (PDR).** Attend a PDR no later than three (3) months ARO. This meeting will be held at the contractor's facility. The meeting shall serve as a review of the contractor's preliminary technical design concepts as well as an opportunity for the contractor and OO-ALC to coordinate on program issues and contract requirements.

2.5 **Critical Design Review (CDR).** Attend a CDR no later than six (6) months ARO. This meeting will be held at the contractor's facility. The meeting shall serve as a review of the contractor's final technical design to be qualified as well as an opportunity for the contractor and OO-ALC to coordinate on program issues and contract requirements.

2.6 **Production Hardware Configuration.** The contractor shall be responsible to incorporate all design changes required to meet Performance Specification 200310516 in all delivered production hardware.

3.0 Systems Engineering

3.1 **Performance Specification.** The proposed wheel and brake system shall meet all criteria set forth in the latest revision of Performance Specification 200310516. The performance specification was written with the intent of providing all necessary taxi and ground maneuvers, and full stop landing maneuvers, in accordance with (IAW) the T-38 Aircraft Technical Orders (T.O.) listed below with no malfunction.

T.O.	Description
1T-38()-06	WORK CODE MANUAL
1T-38()-2-1	AIRCRAFT GENERAL
1T-38()-2-1-1	CROSS SERVICING GUIDE
1T-38()-2-2	GROUND HANDLING, SERVICING, AND AIR FRAME MAINTENANCE
1T-38()-2-2CL-3	JACKING PROCEDURES
1T-38()-2-8	LANDING GEAR
1T-38()-2-8CL-1	REMOVING / INSTALLING MAIN LANDING GEAR WHEEL AND NOSE LANDING GEAR WHEEL PROCEDURES
1T-38()-6WC-1	PREFLIGHT / BASIC POST FLIGHT INSPECTION
1T-38()-6WC-3	PERIODIC INSPECTION
1T-38()-4-8	LANDING GEAR - ILLUSTRATED PARTS BREAKDOWN
1T-38()-4-11	ILLUSTRATED PARTS BREAKDOWN NUMERICAL INDEX

These T.O.s will be made available to the selected contractor for review upon request.

3.2 **Contractor-Performed Testing and Evaluation.** Conduct wheel and brake qualification testing per the contractor Statement of Work (SOW) to demonstrate that performance and specification requirements have been met. The testing shall be completed no later than 16 months ARO.

3.3 **Qualification Report.** Provide a qualification report no later than 17 months ARO that demonstrates full compliance with Performance Specification 200310516 (Latest Revision). The qualification report may be formatted in contractor format, but shall be presented in a sequential order that is consistent with each paragraph (and sub-paragraph) of the Performance Specification. The qualification program submitted in the contractor's proposal will be incorporated as a contract deliverable.

3.4 **Government Flight Test and Service Evaluation Articles.** Provide government flight test and service evaluation articles no later than 18 months ARO. Government flight test and service evaluation articles shall consist of 12 wheel assemblies and 10 brake assemblies to support on-aircraft evaluation of wheel and brake equipment. These articles will be used to perform a form, fit, and function flight evaluation prior to final system approval. The USAF will perform and fund this evaluation. These articles may also be used to accomplish a Technical Order validation and verification (Reference paragraph 5.4).

3.5 **Failure Modes, Effects, and Criticality Analysis (FMECA).** Provide a Failure, Modes, Effects, and Criticality Analysis Report for both the wheel assembly and the brake assembly no later than Critical Design Review. MIL-STD 1629A, Task 101 and Task 102, may be used as a reference guide.

3.6 **Brake Torque Characterization Data (BTCD).** Provide BTCD no later than 13 months ARO. The BTCD shall contain a list of test results per Performance Specification 200310516. Torque performance consistency of this brake is considered critical due to aircraft operation without antiskid. The BTCD may be formatted in contractor format. The BTCD will be incorporated as a contract deliverable.

4.0 Engineering Drawings

4.1 All engineering drawings and associated lists are to be developed in accordance with MIL-DTL-31000 and the applicable CDRL. As part of this contract, engineering drawings and associated list are to be generated and maintained in a digital format with the applicable Metadata. All proprietary drawings are to be identified as soon as possible.

5.0 Technical Orders (T.O.s)

5.1 **Procedural Source Data.** Provide Procedural Source Data for the aircraft technical orders and field technical orders (Job Guides). This data (and future revisions) shall meet the same style, format, and content requirements of existing T-38 wheel and brake source data. (Reference applicable CDRL and TM 86-01).

5.2 **Commodity & Illustrated Parts Breakdown (IPB) T.O.s.** Provide Commodity T.O.s for the wheel assembly and brake assembly. Individual field (Organizational and Intermediate level (O&I)), Depot level, and IPB T.O. data, including tool and fixture design drawings required for back shop wheel and brake repair, to support organizational/intermediate level maintenance and depot overhaul maintenance shall be delivered.

Preliminary T.O. supporting data shall be submitted no later than 17 months ARO. The Commodity T.O. data shall include, as a minimum, the repairs and instructions listed below in paragraphs 5.2.1 and 5.2.2.

5.2.1 Repair - Wheel Assembly. Depot repairs for the wheel assembly shall include, but are not limited to:

- Bearing bore sleeve repairs
- Inflation valve boss repair
- Over-inflation valve boss repair
- Fuse plug boss repair
- Oversize drive key repair
- Oversize insert repair
- Heat damage conductivity and hardness criteria
- Removal limits for all structural components for corrosion and damage
- Re-plating procedures for all plated components

5.2.2 Repair - Brake Assembly. Depot repairs for the brake assembly shall include, but are not limited to:

- Torque tube hardness limits
- Brake piston housing conductivity and hardness limits
- Brake piston housing flange repair
- Re-plating requirements for all plated components
- Re-stack procedure for heat-sink (including all hardware replacement)
- Refurbishment procedure for heat-sink
- Removal limits for structural components for corrosion and damage.

5.2.3 T.O. Formatting. The T.O. data (and future revisions) shall meet the same style, format, and content requirements of current wheel and brake USAF T.O.'s. Source data for existing manuals in the form of unnumbered source data changes shall be compatible with the style and formats of the

existing manuals. Examples of current O&I, Depot and IPB Commodity T.O.'s in the correct format are as follows:

O&I Commodity Wheel: T.O. 4W1-7-1432

Depot Commodity Wheel: T.O. 4W1-7-1433

IPB Commodity Wheel: T.O. 4W1-7-1434

O&I Commodity Brake: T.O. 4B1-2-1272

Depot Commodity Brake: T.O. 4B1-2-1273

IPB Commodity Brake: T.O. 4B1-2-1274

T.O. formatting specifications are as follows:

- Job Guides - MIL-PRF-83495
- Commodities T.O.s - MIL-STD-38784 and MIL-PRF-38807 in SGML format with text, graphics, and delivery according to MIL-STD-1840

5.2.4 T.O. Submittal. Digital data delivery of source data against existing T.O.'s shall be as specified in subparagraph 5.2.4.1.

5.2.4.1 Changes To Existing Technical Manuals. The contractor shall deliver source data changes to existing technical manuals in MS-Word format for text and EPS/CGM format for graphic files on CD-ROM.

5.3 **Guidance Conference.** Attend a T.O. guidance conference after submittal of preliminary T.O. information and before submittal of draft final T.O. information. The conference will be held at a site to be selected by the USAF. The purpose of the conference will be to conduct a review of the preliminary technical data previously submitted by the contractor and the contract data line items to insure compliance with the requirements. Prior to delivery of the final documents, the contractor shall incorporate all changes requested by OO-ALC/LGHLEN and OO-ALC/LGVTN during this meeting. Additional meetings may be required as determined by the USAF.

Following the T.O. guidance conference, draft final T.O. supporting data shall be submitted no later than 21 months ARO.

5.4 **T.O. Validation/Verification.** Coordinate and conduct a T.O. validation and verification with OO-ALC/LGHEL, OO-ALC/LGHS, OO-ALC/LGVTN, and SPO/Users for both O&I and Commodity T.O. supporting data no later than 23 months ARO. The T.O. validation and verification will be held at a site or sites to be selected by the USAF.

6.0 Provisioning Data

6.1 **Initial Provisioning Data.** Provide initial provisioning data for the wheel, brake, and tire system no later than 13 months ARO. This data shall be supplied for both

field O&I and Depot. Separate lists for the wheel assembly and brake assembly shall be provided. As a minimum, the lists shall include the Part Number, Nomenclature, NSN (if a current NSN is already established in the Federal Supply System), Quantity Per Assembly (QPA), projected replacement rates, investment spare parts, expense spare parts, and support equipment required. Contractor format is acceptable.

6.2 **Provisioning Drawings.** Provide a complete set of engineering drawings and associated lists to the piece part level for the purpose of logistics support planning and engineering evaluation no later than 13 months ARO. Commercial Drawings and Associated Lists are acceptable. If a part already has a current National Stock Number (NSN) assigned in the USAF D043 cataloging system (i.e. part is a common part applied to other USAF/DOD programs), the engineering drawing specified for that part is not required and shall not be supplied by the contractor.

6.3 **Tire Change Data.** Provide a complete part number list of items required to perform wheel tire changes (Main seals, o-rings, tie bolts, tie bolt nuts, grease seals, fuse plugs, etc…) no later than 17 months ARO.

6.4 **Installation Provisioning Data and Schedule.** Provide provisioning data and schedule to accomplish USAF cataloging actions and parts reprocurement to support equipment installation. This data shall be delivered no later than 13 months ARO. The contractor shall update the schedule and other provisioning information periodically, as required by the USAF, throughout the contract including all options.

7.0 Logistics

7.1 **Configuration Management.** Provide a Configuration Control Plan that addresses post award configuration control for the system, including configuration requirements addressed in the IMP/IMS. Brief the Configuration Control Plan at an Engineering Control Board and Allocation Configuration Control Board review as required by the USAF no later than seven (7) months ARO. Configuration management practices outlined in MIL-STD-2549 are recommended.

7.2 **Quality Requirements.** Provide a quality assurance plan with the proposal. The quality assurance plan shall demonstrate contractor compliance with ANSI/ASQC Q-9002/IS0-9002 standards, or equivalent. The contractor's Quality Assurance System shall be available to the contracting officer for audits/surveys throughout the contract including all options.

7.3 **Safety Requirements**.

7.3.1 Accident Prevention. Provide protection to government property to prevent damage during the period of time the property is under the control or possession of the contractor. Further, the contractor shall:

- Include a clause in all subcontracts to require subcontractors to comply with the safety provision of this contract.
- Insure that the safety designed into the wheels and brakes is not degraded by the repair methods, procedures, or changes initiated during work processes associated with this contract.
- Comply with all safety provisions and technical specifications listed in the technical publications referenced in this contract.

7.3.2 Accident/Incident Reporting And Investigation. Report promptly to the Administrative Contracting Officer all available facts relating to each instance of damage to government property at the contractors facility. When a major mishap ($10,000 or more) involving government property at the contractor's facility occurs, immediately secure the accident scene and damaged item(s) or wreckage until released by the accident investigative authority as designated by the OO-ALC Safety Office. Such release will be accomplished through the Administrative Contracting Officer.

7.4 **Occupational Safety and Health Plan.** Provide an Occupational Safety and Health Plan for maintenance and repair of wheels and brakes at USAF depot overhaul facilities and bases. This plan shall identify safety and health risks associated with wheel/brake repair and maintenance, including long-term exposure risks. The plan shall also identify recommended shop practices, procedures, protective equipment, and tools to reduce health and safety risks to shop personnel. Material Safety Data Sheets shall be provided for all potential hazards. The scientific basis behind all recommendations shall be provided. A draft Occupational Safety and Health Plan shall be submitted no later than 14 months ARO after which a review will be conducted by the USAF. The final Occupational Safety and Health Plan shall be submitted no later than 19 months ARO.